

The New England SPARROW Model

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The New England SPARROW (Spatially Referenced Regressions on Watershed Attributes) Model is a GIS-based tool for estimating Nitrogen (TN) and Phosphorus (TP) levels in streams and watersheds. The model, which was developed through EPA's TMDL, Nutrient-Criteria Development, and the Long Island Sound (LIS) programs, as well as matching funds from the USGS, provides a level of detail for a regional model that would be cost prohibitive using deterministic water-quality models. The strength of the model is that it defines an empirical (regression) relationship between actual in-stream water quality and watershed characteristics (e.g., land use, population density, soil permeability, percent wetlands) and pollution sources. This relationship is used to predict nutrient concentrations and loads in streams, as well as the major sources of these loads. The model also makes these predictions where no water-quality data exist. Because SPARROW is a statistical model, it provides confidence intervals for each prediction to help assess the effectiveness of the model. The model is being used to assess N and P loads throughout New England, including about 50,000 stream segments and their watersheds, which average about 3-4 sq. mile in size. The model's TN and TP flux estimates are also being used in the analysis of Northeastern U.S. estuarine and coastal waters for EPA's National Coastal Condition Report scheduled for completion later this year.

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